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Statutory Provision, Rule or Requirement	As applied to
The portion of Rule 69.727(a), 47 C.F.R. § 69.727(a), requiring satisfaction of the Phase I triggers specified in Rules 69.709(b), 69.711(b) and 69.713(b) for an MSA or non-MSA portion of a study area in order to be granted Phase I relief for the services specified in Rules 69.709(a) (dedicated transport and special access services other than channel terminations between ILEC end offices and customer premises), and 69.711(a) (channel terminations between ILEC end offices and customer premises), <i>but not the portion of Rule 69.727(a) providing such relief (which includes contract tariff authority).</i>	All Price Cap ILECS  All Price Cap ILECs
Rule 69.705, 47 C.F.R. § 69.705, requiring price cap ILECs to follow the procedures in Rule 1.774 to obtain Phase I pricing flexibility relief.	All Price Cap ILECS
If necessary, the requirement that packet-switched or optical transmission services must be subject to price cap regulation in order to be eligible for pricing flexibility. Previously, some price cap ILECs had not included their packet-switched and optical transmission services in their price cap tariffs, and those services thus were not eligible for pricing flexibility. <i>See, e.g., Petition for Waiver of Pricing Flexibility Rules for Fast Packet Services</i> , Memorandum Opinion and Order, 20 FCC Rcd 16840, 16843-44 ¶ 7 (2005) (“ <i>Verizon Advanced Services Waiver</i> ”); <i>Qwest Petition for Waiver of Pricing Flexibility Rules for Advanced Communications Networks Services</i> , Order, 22 FCC Rcd 7482, 7483 ¶ 2 (WCB 2007) (“ <i>Qwest Advanced Services Waiver</i> ”) (together, “ <i>Advanced Services Waiver Orders</i> ”). In order to provide the “blanket” Phase I pricing flexibility authority sought here for any price cap ILECs whose packet-switched and/or optical transmission services have not received forbearance relief but which are also not otherwise subject to price cap regulation, the Commission should forbear from the requirement that services must be in price caps to be eligible for Phase I pricing flexibility. <i>Cf. Verizon Advanced Services Waiver</i> , 20 FCC Rcd at 16844 ¶ 8 & n.32; <i>Qwest Advanced Services Waiver</i> , 22 FCC Rcd at 7484 ¶ 5 & n.20 (waiving requirement that packet-switching services must be in price caps to be eligible for Phase I pricing flexibility). In order to treat those services the same as price cap services for purposes of this request, they should continue to be offered under currently available tariffs.	All Price Cap ILECS

**47 C.F.R. § 1.54(a)(2)**

USTelecom requests that this forbearance relief be applied as a class to each carrier or group of carriers, as specified for each provision in the table above.

**47 C.F.R. § 1.54(a)(3)**

USTelecom requests that forbearance relief be applied to all covered services, including but not limited to interstate and international voice and data services, whether provided to the consumer or business markets.

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**47 C.F.R. § 1.54(a)(4)**

USTelecom requests that forbearance relief apply in all regions across the entire United States and all territories.

**47 C.F.R. § 1.54(a)(5)**

N/A.

**47 C.F.R. § 1.54(c)**

Pursuant to the requirements of Section 1.54(c) of the Commission's rules, USTelecom notes that it has participated in the following proceedings pending before the Commission, in which it has taken positions regarding regulatory relief from the subject rules and regulations that are identical to, or comparable to, the relief sought in this petition:

- *Petition of USTelecom for Declaratory Ruling that Incumbent Local Exchange Carriers Are Non-Dominant in the Provision of Switched Access Services*, WC Docket No. 13-3.
- *Petition of USTelecom for Forbearance Pursuant to 47 U.S.C. § 160(c) from Enforcement of Certain Legacy Telecommunications Regulations*, WC Docket No. 12-61.
- *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps To Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act*, GN Docket No. 11-121.
- *Connect America Fund*, WC Docket No. 10-90.
- *Special Access for Price Cap Local Exchange Carriers; AT&T Corporation Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services*, WC Docket No. 05-25, RM-10593.
- *Notice of Inquiry Concerning a Review of the Equal Access and Nondiscrimination Obligations Applicable to Local Exchange Carriers*, CC Docket No. 02-39.
- *Biennial Regulatory Review Separate Affiliate Requirements of Section 64.1903 of the Commission's Rules*, CC Docket No. 00-175.

In addition to these pending proceedings, USTelecom has routinely participated in the Commission's biennial reviews of its telecommunications regulations in which it has advocated for the elimination of various regulations that are the subject of its Forbearance Petition.

**47 C.F.R. § 1.54(e)(3)(i)**

The scope of relief sought is as indicated above.

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***47 C.F.R. § 1.54(e)(3)(ii)***

Market analysis and supporting data supporting the entirety of the relief sought in this Petition is set forth in the affidavits of Dr. Kevin Caves and Professor John Mayo, Appendices B and C, respectively, to this Petition. Additional market analysis and supporting data is included both in the Executive Summary and Introduction section of the Petition, and in each discrete request for Section 10 Forbearance, as appropriate.

***47 C.F.R. § 1.54(e)(3)(iii)***

The supporting affidavits of Dr. Kevin Caves and Professor John Mayo are provided as Appendices B and C, respectively, to the Petition.



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**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Petition of USTelecom for Forbearance Pursuant	)	WC Docket No. 14-__
to 47 U.S.C. § 160(c) from Obsolete ILEC	)	
Regulatory Obligations that Inhibit Deployment of	)	
Next-Generation Networks	)	

**Expert Declaration of Kevin W. Caves, PhD**  
October 6, 2014

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### INTRODUCTION

1. In its 2010 *Phoenix Order*, the Federal Communications Commission (“FCC” or “Commission”) established a framework for evaluating requests for forbearance from traditional monopoly-based regulations that currently govern local voice services provided by Incumbent Local Exchange Carriers (“ILECs”).<sup>1</sup> In this study, I analyze the degree of competition in the market for voice services, focusing on the price-disciplining effects of intermodal alternatives in general and wireless voice services in particular, as well as the framework for competitive analysis adopted by the Commission in the *Phoenix Order*.

2. Based on the analysis below, I conclude (1) that ILEC wireline voice offerings face widespread competition, with prices disciplined by a range of competitive alternatives, including wireless telephony, cable voice, over-the-top VoIP, and offerings from Competitive Local Exchange Carriers (“CLECs”); (2) that, in contrast with the *Phoenix Order*’s conclusions, the available evidence shows clearly and unambiguously that wireless voice service has evolved into a competitive alternative to wireline service; (3) that certain aspects of the analytical framework adopted by the Commission in the *Phoenix Order* are inconsistent with fundamental principles of economics and antitrust; and (4) that these inconsistencies will tend to preclude the Commission from properly incorporating the price-disciplining effects of wireless and other competitive alternatives into its own analyses.

3. My conclusions regarding the growth in competition in the industry reflect a consensus that has been accumulating for the better part of a decade, if not longer. For example,

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1. *In the Matter of Petition of Qwest Corporation for Forbearance Pursuant to 47 U.S.C. § 160(c) in the Phoenix, Arizona Metropolitan Statistical Area, Memorandum Opinion And Order*, WC Docket No. 09-135 (June 22, 2010) [hereafter *Phoenix Order*], ¶1 (“We evaluate Qwest’s petition using a market power analysis, similar to that used by the Commission in many prior proceedings and by the Federal Trade Commission (FTC) and the Department of Justice (DOJ) in antitrust reviews.”)



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even economists studying cord-cutting patterns in early time periods (1999 – 2001), when wireless-only households were a rare phenomenon, drew attention to the possibility that mobile wireless service would be able to significantly constrain wireline pricing power in the “near future.”<sup>2</sup> More broadly, prominent economists and leading economics textbooks have recognized the price-disciplining effects of competitive alternatives to traditional wireline voice service since at least the mid-2000s.<sup>3</sup>

4. My conclusions also reflect substantial evidence of increased competition that has accumulated in the years since the *Phoenix Order* was issued. This evidence includes (but is not limited to) econometric work by myself and other economists, which confirms that the cross-price elasticity between wireless and wireline telephony is positive and highly significant, in both a statistical and an economic sense. Other evidence—including the fact that more than 40 percent of households are now “wireless-only,” and the fact that ILECs’ overall share of voice connections has fallen to less than 20 percent—confirms that the trend towards increased competition has only intensified in recent years. Accordingly, by any reasonable economic standard, the marketplace has transitioned from a former monopoly to an “industry with many players” that compete using a “variety of rapidly developing technologies,” just as economists predicted years ago.<sup>4</sup>

5. The rationale for economic regulation is to nudge an industry “closer to the perfectly competitive ideal than [what it] would have [achieved] in the absence of this type of

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2. See Part III.A.2, *infra*.

3. See Part I, *infra*.

4. *Id.*



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intervention.”<sup>5</sup> But regulation, like anything else, carries costs as well as benefits, and economists recognize that the former can—and often does—outweigh the latter, such that “actual regulation often deviates considerably from optimal regulation and exacerbates market inefficiencies.”<sup>6</sup> Thus, in competitive communications markets, outmoded regulations can be expected to harm consumers, competition, and economic efficiency.<sup>7</sup> It is therefore more important than ever that the Commission ensure that its analytical framework accurately reflects the competitive realities of the industry.

### QUALIFICATIONS

6. My name is Kevin W. Caves. I am a Senior Economist at Economists Incorporated, a premier economic consulting firm in the fields of law and economics, public policy, and business strategy, offering expert consulting and testifying services in the context of litigation, arbitration, proposed mergers and acquisitions, regulatory hearings, and business planning. My business address is 2121 K Street Northwest, Suite 1100, Washington, DC 20037.

7. I served as Assistant Economist at the Federal Reserve Bank of New York before earning a PhD in economics from the University of California at Los Angeles in 2005, specializing in applied econometrics and industrial organization. I have held senior positions in the economic consulting industry for several years. Prior to joining Economists Incorporated, I

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5. W. KIP VISCUSI, JOHN M. VERNON, AND JOSEPH E. HARRINGTON, JR., *ECONOMICS OF REGULATION AND ANTITRUST* (MIT Press 2<sup>nd</sup> ed. 1996), at 10.

6. See DENNIS CARLTON & JEFFREY PERLOFF, *MODERN INDUSTRIAL ORGANIZATION* (Prentice Hall 4<sup>th</sup> ed. 2005) [hereafter *Carlton & Perloff*] at 682. See also Viscusi et. al., *supra*, at 10-11.

7. The potential for regulation to harm consumers in the communications marketplace is not mere speculation. According to one estimate, the FCC’s delay in authorizing cellular service resulted in annual costs of approximately \$34 billion over a ten-year period. (The estimated costs to consumers would be even greater if adjusted for inflation). See Jerry Hausman, “Valuing the Effect of Regulation on New Services in Telecommunications,” *Brookings Papers In Economic Activity: Microeconomics*, 1-38 (1997).

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held positions at Deloitte & Touche, Criterion Economics, Empiris LLC, and Navigant Economics. I have authored and co-authored filings, white papers, and expert declarations, including several encompassing telecommunications and network industries.

8. I am a regular contributor to peer-reviewed academic journals. My academic work spans a variety of topics, including antitrust, telecommunications and network industry analysis, vertical integration, labor economics, applied econometrics, and class certification. My work has been cited and appeared in various popular and academic outlets, including *Antitrust*, *The Atlantic*, *The Capitol Forum*, *Communications & Strategies*, *The Economist*, *The Economists' Voice*, *Forbes*, *Information Economics & Policy*, *Journal of Competition Law & Economics*, *Labor Law Journal*, *Regulation*, *Research in Law & Economics*, *Review of Network Economics*, and *Telecommunications Policy*. A copy of my curriculum vita is attached as Exhibit A.

**I. A RANGE OF COMPETITIVE ALTERNATIVES EXERT COMPETITIVE DISCIPLINE ON  
TRADITIONAL ILEC VOICE SERVICES**

9. Economists have recognized for some time that a range of competitive alternatives exert competitive discipline on ILEC pricing. For example, in a leading economics textbook published nearly a decade ago, Professor Dennis Carlton (former Deputy Assistant Attorney General in the DOJ Antitrust Division) noted that

Competition from wireless providers of phone services has deepened competitive pressures on both local and long distance rates. Roughly half of the U.S. population have cell phones. Moreover, the Internet holds out the possibility of providing competition using the Voice Over Internet Protocol (VOIP), and cable can now provide phone service. Thus an industry that once was a monopoly that provided local and long-distance phone service over traditional phone lines is rapidly becoming an industry with many players using a variety of rapidly developing technologies to provide consumers

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with local and long-distance phone service. In such an industry, regulation can distort or delay the introduction of new technologies, to consumers' detriment.<sup>8</sup>

10. In subsequent years, the trend toward increased competition has intensified on a variety of fronts. As explained below, each of the sources of intermodal competition identified above has become more prominent, and ILEC market shares have continued to erode in tandem. About 93 percent of households are now passed by high-speed cable infrastructure,<sup>9</sup> while approximately 97 percent of consumers are covered by three or more wireless carriers.<sup>10</sup> More than 40 percent of households are "wireless-only,"<sup>11</sup> which, in concert with customer switching to wireline competitors such as cable companies, VoIP providers, and CLECs, has pushed the ILEC household share down to approximately 33 percent.<sup>12</sup> The share of voice connections served by ILECs is even lower (less than 20 percent).<sup>13</sup>

11. More generally, traditional ILEC voice services also face competition from a broad range of rapidly evolving communications technologies such as text messaging, e-mail, and social networks, as well other converged services, such as Skype, FaceTime, iMessage, Snapchat, Viber, and WhatsApp, which transmit various combinations of voice, text, pictures, and video across the globe, often at little to no incremental cost to the consumer. Thus, by any reasonable economic standard, the marketplace has transitioned from a former monopoly to an "industry with many players"<sup>14</sup> that compete using a "variety of rapidly developing technologies,"<sup>15</sup> just as economists predicted years ago.<sup>16</sup>

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8. Carlton & Perloff at 729.

9. See, e.g., <https://www.ncta.com/industry-data>.

10. See, e.g., <http://www.ctia.org/your-wireless-life/how-wireless-works/wireless-quick-facts>.

11. See Part II.A, *infra*.

12. *Id.*

13. See Figure I, *infra*.

14. Carlton & Perloff at 729.

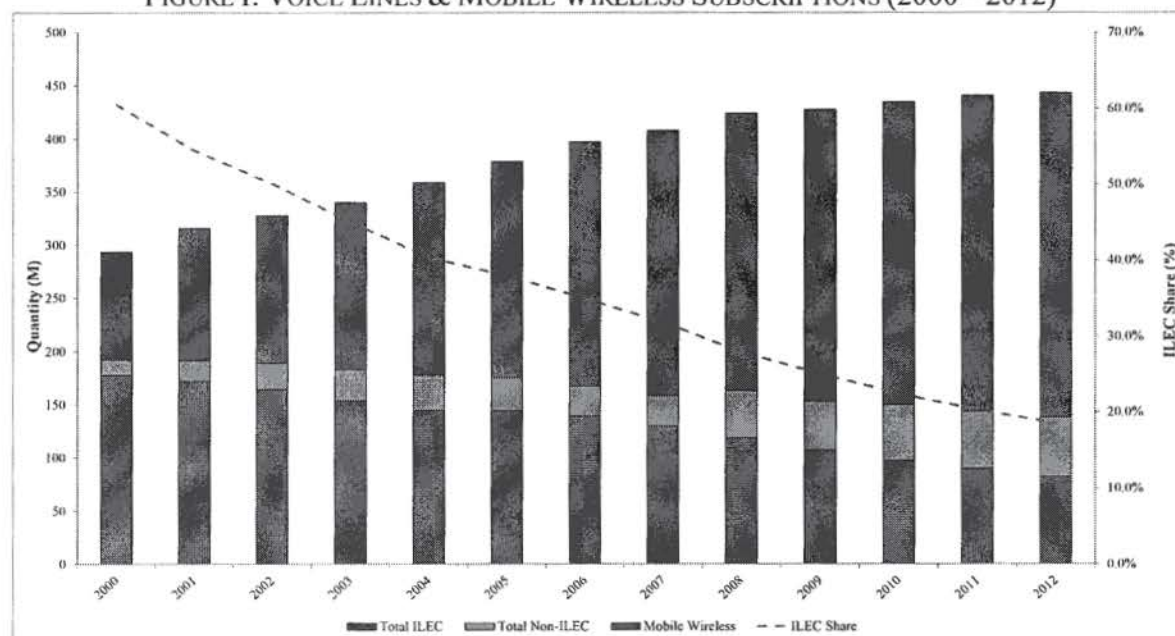
15. *Id.*



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12. As seen in Figure 1, since the early 2000s, ILECs have steadily lost market share to wireless competition, to intermodal technologies such as cable VoIP, and to CLECs. ILECs collectively lost approximately 95.4 million voice lines from 2000 – 2012. Measured as a proportion of end-user switched access lines, interconnected VoIP subscriptions, and mobile wireless subscriptions, ILECs' market share fell from 60.5 percent to 18.5 percent over this interval. By mid-2013, ILEC's market share had declined further, to 17.8 percent.<sup>17</sup> Similar results hold when ILEC market shares are measured as a proportion of households (as opposed to a proportion of total connections). As explained in Part II.A, the ILEC household share had fallen to approximately 33 percent as of 2013.

FIGURE 1: VOICE LINES & MOBILE WIRELESS SUBSCRIPTIONS (2000 – 2012)



Source: Federal Communications Commission, *Local Telephone Competition Reports* (various years). Notes: Total ILEC and Non-ILEC figures include both end-user switched access lines and interconnected VoIP subscriptions. Mandatory reporting by interconnected VoIP service providers was instituted in December 2008. Before this time,

16. *Id.*

17. Federal Communications Commission, *Local Telephone Competition: Status as of June 30, 2013* [hereafter 2013 *Local Competition Report*], Tables 2 and 18 (showing 78.5 million ILEC connections, 56.6 million Non-ILEC connections, and 305.7 million mobile wireless subscriptions).

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wireline carriers included VoIP subscribers in reported switched access lines to a varying and largely unknown degree. Prior to June 2005, the Commission collected data only from carriers with at least 10,000 switched access lines or mobile telephony subscribers in service in a particular state.

13. The collective competitive discipline imposed on traditional ILEC offerings is almost certainly understated in the data presented above. For example, the Commission's statistics on VoIP subscribership include only what the Commission classifies as "interconnected VoIP"<sup>18</sup> and therefore exclude services such as Skype and FaceTime. VoIP technology permits even small competitors to offer voice service to millions of broadband subscribers, and has allowed literally hundreds of new operators to enter the market in recent years.<sup>19</sup> More generally, no weight is given to developments such as the increasingly obsolete distinction between local and long-distance calling, the ability to communicate over long distances via text messaging, e-mail, or social networks, or the emergence of other converged communications services offering various combinations of voice, text, and video, such as iMessage, Snapchat, Viber, and WhatsApp.<sup>20</sup> The rapid entry and expansion of these alternatives to traditional "voice-only" service has transformed the communications marketplace in recent years. For example, an estimated 87 percent of US adults used the Internet as of 2014, up from only 15 percent in 1995,<sup>21</sup> with the vast majority of Internet users communicating via e-mail and social media.<sup>22</sup> Skype alone reported approximately 25 million connected US users as

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18. Interconnected VoIP is distinguished from VoIP service more generally by "permitting users to receive calls that originate on the public switched telephone network *and* to terminate calls to the public switched telephone network." See Federal Communications Commission, *Local Telephone Competition: Status as of December 31, 2012*, at 1.

19. Frost & Sullivan, *VoIP: State of the Over-the-Top Voice Market* (March 2011).

20. See, e.g., Simon Hill, "Who will rule the post-texting world? In search of the ultimate messaging app," *Digital Trends* (May 20 2013), available at <http://www.digitaltrends.com/mobile/best-chat-messaging-apps/> [hereafter *Digital Trends*].

21. Pew Research Internet Project, *Internet Use Over Time*, (August 2014), available at <http://www.pewinternet.org/data-trend/internet-use/internet-use-over-time/>.

22. Pew Research Internet Project, *Three Technology Revolutions*, available at <http://www.pewinternet.org/three-technology-revolutions/>; see also *Search and email still top the list of most*



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of December 2010,<sup>23</sup> and over 280 million global users in 2012,<sup>24</sup> Viber reported reaching 200 million global users as of 2013.<sup>25</sup> In that year, an estimated 153 billion text messages were sent and received each month in the U.S., along with about 10 billion multimedia messages.<sup>26</sup>

14. The trend towards increased competition has not gone unnoticed by industry analysts. The market research firm Frost and Sullivan noted in late 2013 that “[r]esidential voice customers continue to migrate away from traditional landline services to less-expensive options offered by wireless and cable providers.”<sup>27</sup> As shown in Figure II, according to Frost and Sullivan, the rise in residential cable telephony and VoIP subscriptions over the six year interval spanning 2007 – 2013 is substantial, with a cumulative increase of 12.4 million subscribers. Over this same interval, the cumulative decline in the Telco subscriber base came to approximately 39.4 million (from 89.3 million in Q4 2007 to just 49.9 million in Q4 2013). Thus, the data imply that approximately 39.4 million - 12.4 million  $\approx$  27 million subscribers chose to abandon landline service in favor of wireless service between 2007 and 2013, even if population growth is ignored. Indexing the initial subscriber total to the growth in US households since 2007 would increase this figure to approximately 33.1 million. Similar results have been obtained for prior time periods by industry analysts at SNL Kagan.<sup>28</sup>

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*popular online activities*, (August 2011), available at <http://www.pewinternet.org/2011/08/09/search-and-email-still-top-the-list-of-most-popular-online-activities/>.

23. See Skype S.à r.l., *Amendment No. 2 To Form S-1*, available at <http://www.sec.gov/Archives/edgar/data/1498209/000119312511056174/ds1a.htm>.

24. See Microsoft Corporation, *Earnings Release FY13 Q1*, available at <http://www.microsoft.com/investor/EarningsAndFinancials/Earnings/PressReleaseAndWebcast/FY13/Q1/default.aspx>.

25. See Parmy Olson, “Free-Calling App Viber Jumps To Desktop, Hits 200 Million Users,” *Forbes* (May 7, 2013), available at <http://www.forbes.com/sites/parmyolson/2013/05/07/free-calling-app-viber-jumps-to-desktop-hits-200-million-users/>.

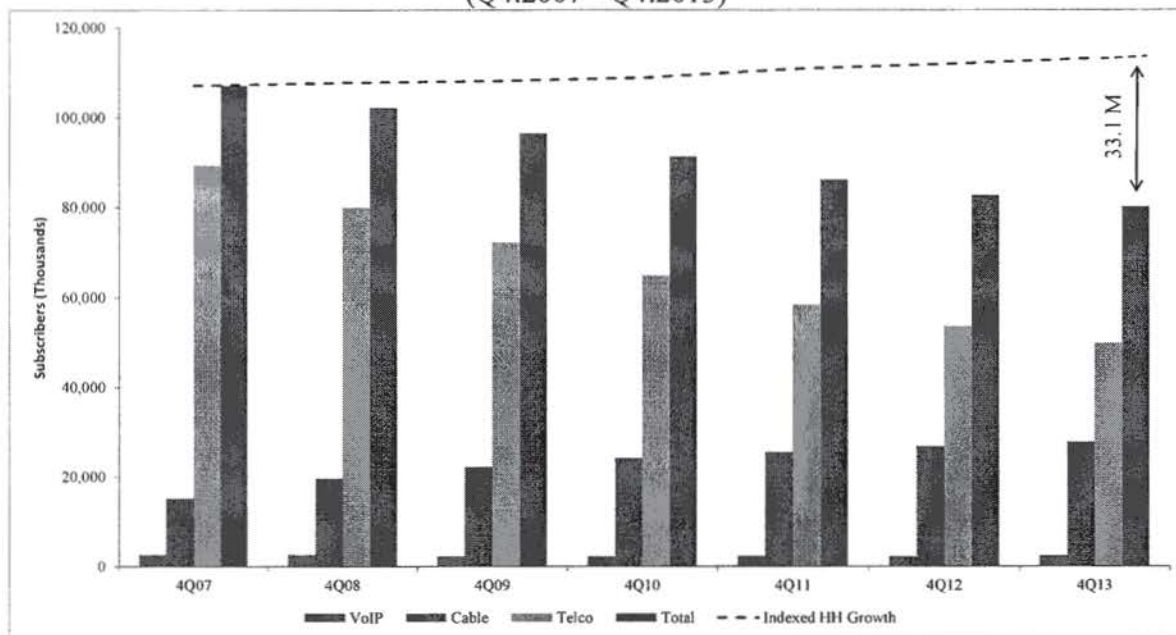
26. See <http://www.ctia.org/your-wireless-life/how-wireless-works/annual-wireless-industry-survey>.

27. Frost & Sullivan, *North American Voice Tracker: Third Quarter 2013 CCS 7-28* (December 2013).

28. See Part II, *infra*.



FIGURE II: SUBSCRIBERSHIP AMONG ILEC VOICE & SELECTED COMPETITIVE ALTERNATIVES  
(Q4:2007 – Q4:2013)



Notes: Residential VoIP, Cable, and Telco subscriber counts from Frost & Sullivan, *North American Voice Tracker: Fourth Quarter 2013 CCS 8-6* (March 2014). Household growth index computed from Census H-1 household counts.

15. The data also show that business customers are rapidly switching away from ILEC voice services and towards competitive alternatives. In addition to more traditional voice offerings from cable companies or CLECs, a large proportion of businesses have access to high-speed broadband, which in turn permits access to a variety of competitive VoIP offerings.<sup>29</sup> According to the Commission's latest *Local Competition Report*, from December 2008 – June 2013, ILEC business line counts declined by approximately 12.5 million, for a loss of "only" 27 percent (compared with approximately 34 percent overall).<sup>30</sup> Over this same interval, non-ILEC

29. For example, a recent NTIA survey found that download speeds of 10Mbps or faster were available in 98 percent of businesses as of June 2012. See National Telecommunications & Information Administration, *Broadband Availability In The Workplace* (November 2013), at Figure 2.

30. 2013 *Local Competition Report*, Table 2.

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business line counts grew by approximately 5.4 million.<sup>31</sup> The fact that ILECs appear to be losing business landlines at a significantly faster pace than they are being replaced by non-ILEC lines suggests that traditional ILEC business voice subscriptions are being replaced to a significant degree by non-traditional services (e.g., Skype for business) that may not be captured by the FCC's current data collection protocols.<sup>32</sup>

16. All of the major cable multiple-system operators ("MSOs") have entered the business services market, offering voice service in conjunction with various data-intensive products.<sup>33</sup> Comcast and Time Warner Cable collectively sell more than \$5 billion worth of Internet, voice, and network services to business customers annually, and each company's business revenues have experienced growth rates in excess of 20 percent over the past year.<sup>34</sup> As of 2013, Cox reported more than \$1.6 billion in annual business revenue, and served more than 330,000 companies in its geographic footprint.<sup>35</sup>

17. There is also evidence that cable MSOs and other competitors are significantly expanding their capacity to serve commercial customers, with many providers attaining (or poised to attain) Carrier Ethernet 2.0 ("CE 2.0") certification.<sup>36</sup> The CE 2.0 standard supports an

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31. *Id.*

32. *Id.* at 1, n. 2 ("We note that the current interpretation of element (4) of the definition excludes the VoIP services that Skype offers in the United States, and subscribers to those services are not reported on Form 477."). See also <http://www.forbes.com/sites/kateharrison/2012/08/08/how-to-break-up-with-your-landline/>; [http://www.pcworld.com/article/260859/voip\\_buying\\_guide\\_for\\_small\\_business.html](http://www.pcworld.com/article/260859/voip_buying_guide_for_small_business.html); <http://www.skype.com/en/business/>.

33. Cable Industry Insider, "Cable Operations & Ethernet: Serious Market Share," (August 2013).

34. Liana B. Baker, "Comcast: Business services is sweet spot in Time Warner Cable deal," *Reuters* (April 1, 2014).

35. See, e.g., Alan Breznick, "Cox Joins Carrier Ethernet 2.0 Club" *LightReading* (June 6, 2014) [hereafter *Breznick 2014*].

36. *Id.* ("Cox Business has received Carrier Ethernet 2.0 certification from the Metro Ethernet Forum (MEF), putting it in position to offer more advanced Ethernet services to its commercial customers. Cox Business...thus becomes the third major US MSO business services unit to gain the Carrier Ethernet 2.0 blessing from Metro Ethernet Forum (MEF). Previously, the business divisions of Comcast Corp. (Nasdaq: CMCSA, CMCSK) and Time Warner Cable Inc. (NYSE: TWC) won that stamp of approval, along with the commercial services arms of



array of data-intensive commercial applications, including VoIP,<sup>37</sup> and allows carriers to expand their geographic footprints for such services.<sup>38</sup> Several cable companies (Comcast, Time Warner, Cox, RCN) have already obtained CE 2.0 certification, as have some CLECs.<sup>39</sup>

18. Relatedly, analysts have recently reported that MSOs in the U.S. have been “aggressively deploying”<sup>40</sup> high-speed data networks based on DOCSIS 3.0 technology, which allows for high-speed data connections, as well as voice service.<sup>41</sup> Analysts have noted that operators’ infrastructure investments in DOCSIS 3.0 are “paying off in new subscribers and upgrades to existing subscribers’ services,”<sup>42</sup> as indicated by significant growth in demand for broadband customer premises equipment in recent years.<sup>43</sup>

## II. ROBUST LONG-TERM TRENDS SUPPORT THE HYPOTHESIS THAT WIRELINE VOICE COMPETES WITH WIRELESS VOICE

19. A key question addressed in the *Phoenix Order* was whether or not wireless voice offerings exert significant competitive discipline on traditional ILEC wireline voice

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such smaller cable operators as RCN Corp. The Carrier Ethernet 2.0 accreditation means Cox can broaden the scope and range of Ethernet services that it can offer to commercial customers.”) See also Dan O’Shea, “MEF: CE 2.0 Certification Pipeline Filling Up” *LightReading* (January 10, 2014) <http://www.lightreading.com/ethernet-ip/carrier-ethernet-20/mef-ce-20-certification-pipeline-filling-up/d/d-id/707237>

37. Metro Ethernet Forum, *The Case for Carrier Ethernet 2.0* (February 2012), at 4 (describing “the most common Carrier Ethernet applications, all of which are enhanced by implementing Carrier Ethernet 2.0,” as “[s]ite-to-site access, server consolidation, business continuity/disaster recovery, Enterprise-class cloud-based applications, Internet access, distributed imaging, distributed storage area networks, VoIP, streamed/interactive video, L2-VPNs, virtualization.”)

38. See Breznick 2014 (“Most notably, the advanced MEF standard enables broadband providers to offer multiple classes of services and interconnect with other broadband networks to deliver Ethernet services over larger geographic areas.”)

39. *Id.* See also Metro Ethernet Forum *Services Certification Registry* (showing “unique MEF-sourced listing of those companies that have achieved certification of CE 1.0 and/or CE 2.0 compliance of their services and products.”) Available at <http://www.metroethernetforum.org/certification/services-certification-registry>

40. Zacks Equity Research, *DOCSIS 3.0 Market Thriving* (December 17, 2013).

41. *Id.* See also Alan Breznick, “Docsis 3.0 Strikes Bonanza” *LightReading* (July 19, 2013) [hereafter *Breznick 2013*] (“Worldwide shipments of broadband consumer premise equipment (CPE) hit a new high of 144.9 million units last year, thanks in large part to the growth of Docsis 3.0 cable modems, voice modems, routers, gateways and other home devices.”)

42. Infonetics Research, *DOCSIS 3.0 boosts broadband CPE market; Huawei, ZTE in scrum for 1<sup>st</sup>* (July 18, 2012).

43. *Id.* See also Breznick 2013.



service. Although the *Phoenix Order* acknowledged that “the increasing number of households that rely solely on mobile wireless services suggests that more consumers may view mobile wireless as a closer substitute for wireline voice service than in the past,”<sup>44</sup> the *Phoenix Order*’s market power analysis ultimately concluded that there was insufficient evidence in the record to conclude that wireless voice service “may materially constrain the price of residential wireline voice service.”<sup>45</sup> Noting that most households have both a landline and a wireless subscription, the *Phoenix Order* found instead consumers used mobile wireless service “to supplement their wireline service rather than as a substitute for their wireline service.”<sup>46</sup>

20. According to fundamental economic principles, “Goods...where an increase in the price of one leads to an increase in the quantity of the other...are referred to as substitutes.”<sup>47</sup> Commonsense examples include “coffee and tea, Toyotas and Hondas, and air conditioners and fans.”<sup>48</sup> On the other hand, two goods are considered economic complements if an increase in the price of one leads to a decrease in the demand for the other. Commonsense examples include “[c]offee and cream...cars and gasoline, and baseball gloves and baseballs.”<sup>49</sup> (From these definitions, it should be clear that the fact that some customers purchase two goods at the same time does not necessarily imply that the two goods are complements). As explained in this section and the next, well-documented trends in the available data are far more supportive of the hypothesis that mobile wireless service is, in the economic sense of the word,

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44. *Phoenix Order*, ¶60.

45. *Id.*, ¶55.

46. *Id.*, ¶59.

47. MICHAEL L. KATZ & HARVEY S. ROSEN, MICROECONOMICS (Irwin McGraw-Hill 3<sup>rd</sup> ed. 1998) [hereafter *Katz & Rosen*] at 60 (emphasis in original).

48. *Id.*

49. *Id.*

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“a...substitute for wireline voice service”<sup>50</sup>—such that an increase in the price of one service leads to an increase in demand for the other—than the alternative hypothesis that wireless and wireline are economic complements—such that an increase in *either* the price of wireless *or* the price of wireline would cause demand for *both* services to contract.

21. It is now widely recognized that the share of “wireless-only” households in the U.S. has increased very rapidly since the early 2000s, and that these customers now represent a substantial fraction of the market for voice communications. Unsurprisingly, the data also reveal that the demand for traditional ILEC wireline connections has fallen off sharply. Throughout this time period, overall demand for wireless service has surged, while overall demand for traditional wireline telephony has declined steeply.<sup>51</sup>

22. These observed trends imply that consumers’ collective willingness to replace wireline service with wireless service at the margin has increased substantially: Holding all else fixed, it can be inferred that the price of wireline service would have to fall substantially in order for the share of “wireless-only” households to revert from its current level (over 40 percent) to the levels observed in the early 2000s (in the neighborhood of 1 percent). It is also clear that these trends are not confined to any narrow geographic area or demographic niche. To the contrary, the data reveal that this is a widespread phenomenon, based on state and county-level estimates of the percentage of individuals living in “wireless-only” households, in addition to estimates of the wireless-only share by age group, ethnicity, and income.

23. The broad-based and sustained increase in wireless-only households documented below occurred at a time when wireless prices were declining, both in absolute terms and

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50. *Phoenix Order*, ¶60.

51. See Figure I, *supra*.

relative to landline prices, which have typically been subject to regulation, and have remained relatively stable, even increasing somewhat on average.<sup>52</sup> Therefore, as the relative price of wireless voice service has fallen, the share of wireless-only households has surged, while demand for traditional fixed line service has declined steeply. These long-term trends support the hypothesis that wireless and wireline service are competitive alternatives, but not the alternative hypothesis that they are complements.

24. Of course, the trends documented in this section are not equivalent to econometric estimates of the cross-price elasticity between wireless and wireline service (which are dealt with in Part III). Nevertheless, it bears emphasis that agencies such as the Department of Justice (“DOJ”) and the Federal Trade Commission (“FTC”)—whose overall framework for antitrust analysis is explicitly endorsed in the *Phoenix Order*<sup>53</sup>—are frequently obliged to conduct their own analyses of market power without the luxury of robust econometric evidence to precisely quantify customer switching patterns.<sup>54</sup> To assess the extent of competition among differentiated products (of which wireless and wireline service are a prime example), the *Horizontal Merger Guidelines* direct the agencies to “consider any reasonably available and reliable information to evaluate the extent of direct competition between the products sold by

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52. See, e.g., Kevin W. Caves, *Quantifying Price-Driven Wireless Substitution in Telephony*, 35 TELECOMMUNICATIONS POLICY 984-998 (December 2011) [Attached as Exhibit B; hereafter *Caves (2011)*], Figure 2.

53. *Phoenix Order*, ¶1.

54. See, e.g., Carl Shapiro, *The 2010 U.S. Horizontal Merger Guidelines: From Hedgehog to Fox in Forty Years*, 77 ANTITRUST LAW JOURNAL 701-759 (2010), at 741-42 (“DOJ economists and the economists consulting for the merging parties routinely devote considerable effort to estimating demand, using whatever reliable and relevant data are available. However, we often lack sufficient data to reliably and robustly estimate the demand system, making it necessary to follow approaches that are less stringent in terms of their data or modeling requirements.”).



the merging firms,”<sup>55</sup> including “customer switching patterns, and customer surveys.”<sup>56</sup> Data sets that document these patterns, such as those discussed below, should therefore be assessed as evidence of direct competition between wireless and wireline voice service.

**A. National Trends**

25. For more than a decade, an increasing tendency for households to abandon wireline voice service in favor of wireless service has been well documented in publicly available data. The Centers for Disease Control and Prevention (“CDC”), through the National Health Interview Survey (“NHIS”), conducts biannual interviews of tens of thousands of households drawn from the civilian, non-institutionalized population.<sup>57</sup> The NHIS identifies a household as “wireless-only” if (1) there is no functioning landline inside the household; and (2) at least one family member living in the household possesses a functioning wireless telephone.<sup>58</sup>

26. As seen in Figure III, the NHIS data show that the proportion of US households using wireless voice service in lieu of a landline connection reached 41.0 percent by the second half of 2013. Given the large number of observations they reflect, the NHIS estimates are statistically precise. For example, the 2013 point estimate is based on a sample of 21,512 households, with a 95 percent confidence interval of 39.8 – 42.3 percent.<sup>59</sup>

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55. US Department of Justice and Federal Trade Commission, Horizontal Merger Guidelines (August 19, 2010) [hereafter *Merger Guidelines*], §6.1.

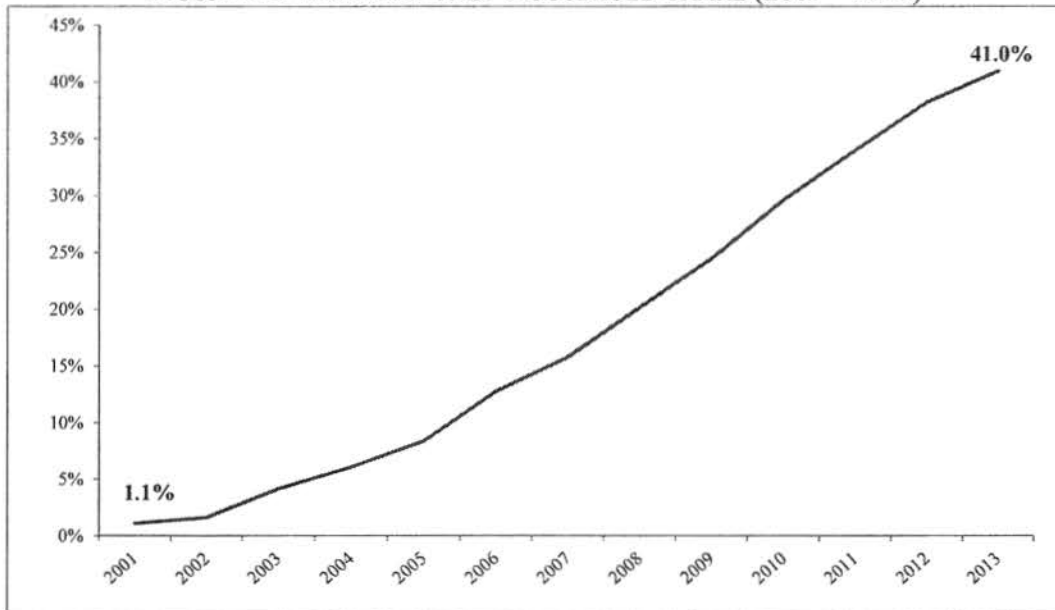
56. *Id.*

57. See, e.g., Stephen Blumberg and Julian Luke, *Wireless Substitution: Early Release of Estimates From the National Health Interview Survey*, Division of Health Interview Statistics, National Center for Health Statistics, Centers for Disease Control & Prevention (January – June 2013) [hereafter *Blumberg & Luke (2013)*]. The Commission has previously acknowledged some of the key trends documented in the NHIS. See *Sixteenth CMRS Report* at 25-26.

58. *Blumberg & Luke (2013)* at 2 (“Households are identified as “wireless-only” if they include at least one wireless family and if there are no working landline telephones inside the household.”)

59. Stephen Blumberg and Julian Luke, *Wireless Substitution: Early Release of Estimates From the National Health Interview Survey*, Division of Health Interview Statistics, National Center for Health Statistics, Centers for Disease Control & Prevention (July – December 2013) [hereafter *Blumberg & Luke (2013b)*], Table 1.

FIGURE III: WIRELESS-ONLY HOUSEHOLD SHARE (2001 – 2013)



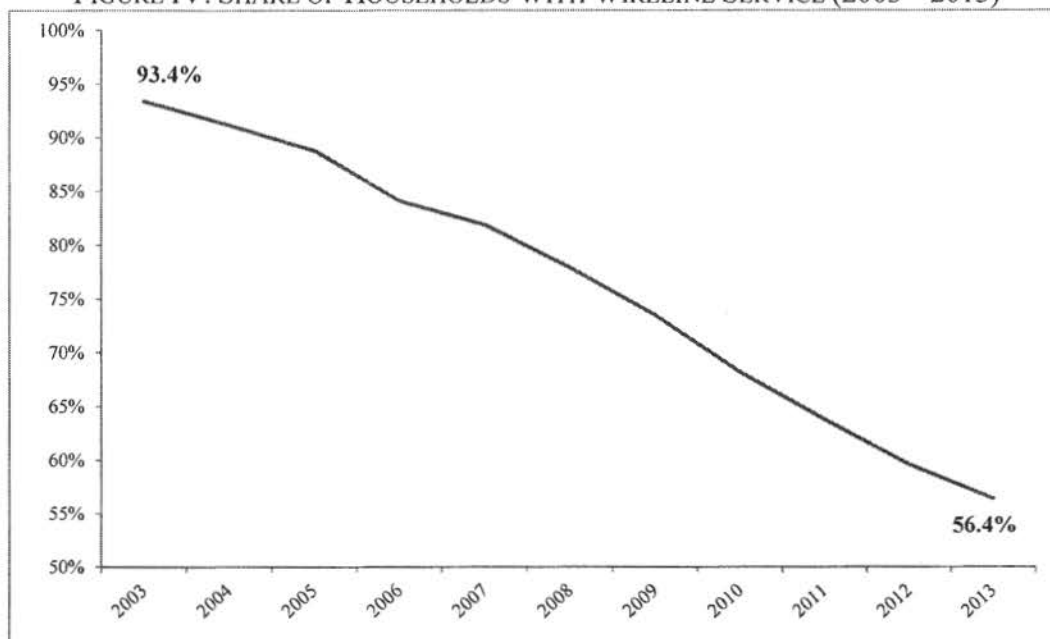
Notes: Data for 2003 onward reflect the NHIS wireless-only share for second half of each year. Data for 2001 – 2002 reflect FCC estimates of wireless-only households as a proportion of total US Households. See FCC, *Trends In Telephone Service* (Aug. 2008), Table 7.4.

27. Unsurprisingly, the NHIS data also reveal a steep decline in the proportion of households purchasing landline service. As illustrated in Figure IV, as recently as 2003, more than 90 percent of households surveyed reported having at least one functioning wireline telephone. Over the course of the next decade, the wireline share has fallen to well under 60 percent.<sup>60</sup> Further, given that Non-ILECs accounted for about 41 percent of residential landlines as of 2013,<sup>61</sup> the ILEC household share can be estimated at approximately  $(1 - 0.41) \times 0.56 \approx 33$  percent.

60. As before, the large NHIS sample sizes reinforce the statistical precision of the point estimates underlying these figures. See *Blumberg & Luke (2013b)*, Table 1.

61. 2013 *Local Competition Report*, Table 10.

FIGURE IV: SHARE OF HOUSEHOLDS WITH WIRELINE SERVICE (2003 – 2013)



Notes: Share of NHIS survey respondents with landline service computed as the sum of (Landline with wireless + Landline without wireless + Landline with unknown wireless). Because the proportions sum to 100 percent, the statistic can be equivalently computed as the 100 minus the sum of (Nonlandline with unknown wireless + Wireless-only + Phoneless).

28. Because they do not capture usage, the trends documented in Figures I and II tend to understate the shift in consumer demand away from wireline telephony. Starting in 2007, the NHIS began to record whether “all or almost all calls are received on cell phones, some are received on cell phones and some on regular phones, or very few or none are received on cell phones.”<sup>62</sup> This yields an estimate of the proportion of “wireless-mostly” households, which the NHIS defines as households with both landline and mobile service inhabited by families receiving all or almost all calls on mobile phones.<sup>63</sup> As of late 2013, an estimated 16 percent of all households were “wireless-mostly;” these households represent approximately 34

62. *Id.* at 4.

63. *Id.* at 3-4.



percent of all households with both a landline and a wireless connection, up from approximately 22 percent in 2007.<sup>64</sup>

29. Industry analysts have found wireless competition to be the driving factor behind the continued erosion of the landline business. In 2011, analysts at SNL Kagan, while acknowledging that “[c]able phone alternatives have eroded the once dominant position of the telcos, taking one-fifth of the segment at the end of 2010,”<sup>65</sup> nevertheless found that “[w]ireless replacement has played the single largest role in the changing landscape.”<sup>66</sup> The Kagan analysts also predicted (accurately) that the wireless-only household share would reach approximately 40 percent by 2013.<sup>67</sup> More recently, analysts at Frost and Sullivan have reached similar conclusions.<sup>68</sup>

#### **B. State and Regional Trends**

30. For several years, the NHIS has also produced estimates at the state and county level.<sup>69</sup> To obtain these geographically disaggregated estimates, the NHIS combines demographic data from the Census Bureau’s American Community Survey (“ACS”), along with

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64. *Blumberg & Luke (2013b)* at 4; see also Stephen Blumberg and Julian Luke, *Wireless Substitution: Early Release of Estimates From the National Health Interview Survey*, Division of Health Interview Statistics, National Center for Health Statistics, Centers for Disease Control & Prevention (July – December 2007), at 3.

65. Ian Olgeirson and Mari Rondeli, “Wireless substitution cuts into wireline phone forecast,” SNL Kagan *Multichannel Market Trends* (April 18, 2011).

66. *Id.*

67. *Id.*

68. See Part I, *supra*.

69. The NHIS first released state-level cord-cutting estimates in 2009. See Stephen Blumberg et. al., *Wireless Substitution: State-level Estimates From the National Health Interview Survey, January – December 2007* National Center for Health Statistics, Centers for Disease Control & Prevention (March 11, 2009). Subsequent state-level analyses yielded updated estimates with a greater degree of statistical precision. See Stephen Blumberg et. al., *Wireless Substitution: State-level Estimates From the National Health Interview Survey, January 2007–June 2010* National Center for Health Statistics, Centers for Disease Control & Prevention (April 20, 2011); see also Stephen Blumberg et. al., *Wireless Substitution: State-level Estimates From the National Health Interview Survey, 2012* National Center for Health Statistics, Centers for Disease Control & Prevention (December 18, 2013) [hereafter *Blumberg et. al. (2013)*].